Appendix F

Cross-site Research Opportunities for
Enhancing Behavioral Change Research

A unique aspect of the BCC has been investigators' willingness to work together to address common conceptual and methodological issues in the health behavior and behavior change field. Several trans-BCC workgroups have been formed, including three focused on the major behavioral outcomes (e.g, physical activity, nutrition/diet; and tobacco dependence) and several based on cross-cutting themes (e.g., recruitment and retention; treatment fidelity; motivational interviewing; research representation and translation; data analysis and methodology; common mediators and outcomes).

Using a common template, these work groups have come together over the past two months to identify exciting and timely research opportunities that can make significant conceptual and methodological contributions to the behavior change research field.

We have complied several of these research ideas for consideration by potential funders. All of the following proposals (see attached) were discussed in plenary and workgroup venues at the December meeting and judged to be meritorious. In addition to substantive research questions, there is a need for some modest infrastructure support to permit common data analytical support and research translation activities.

These research opportunities (in alphabetical order) are:

- Examining Factors Related to Organizational Level Maintenance/Institutionalization of Health Promotion Programs (Glasgow et al.)
- Examining the Relationship Between Social Support and Behavior Change, Health Outcomes, and Quality of Life (Toobert et al.)
- Exploring the Role of Environmental Influences on Regular Physical Activity (King et al.)
- Measurement of Activity in Older Adults: A Multi-Study Comparison (Resnick et al.)
- Self-Determination and its Relation to Depression (Williams et al.)
- Testing the Retention Effectiveness of Three Delivery Systems in Underserved Populations (Sher et al.)
- Using GIS Lifestyle Segmentation to Profile Physically Inactive Lifestyle Clusters (Welk, Fridinger et al.)

Our goal is to match good research ideas seeking funding with potential funding sources, both within government and the private foundation sector. We are hoping that NIH ICs would be interested in supporting these activities, with either FY 2002 or FY 2003 funds.

Because of the unique opportunities presented by the BCC with their relatively modest costs and time-dependent nature, administrative rather than competitive supplements are being sought. These research opportunities are written in brief format and are intended to stimulate a dialogue with potential funders. BCC Investigators are quite willing to revise their proposals to match the requirements of specific ICs or funding agencies.

The NIH group may want to discuss logistical and administrative issues for cross-site supplements such as:

- What mechanism can be set up so there is coordination and information exchange across interested ICs?
- How might this match between proposed ideas and potential funders operate?
- Do ICs simply want to review the different proposals and consider the match with their individual research missions?
- Would ICs consider joint support of particular proposals—in the spirit of the original funding consortium?
- What happens if one IC is interested in supplementing a proposal that comes from an investigator funded by another Institute?
- Why are these requests being considered as administrative supplements versus competing applications? What is it about the nature of the activity or proposed time frame that makes the administrative route ideal?
- The brief research statements indicate their unique contributions to furthering behavioral science research. Does each IC have an internal system for reviewing such administrative requests—or will it be necessary to set up an advisory review to evaluate the worthiness of the different proposals?
- What channels of communication are desired between BCC investigators and funding agencies? How will investigators learn if any ICs are interested in their proposals?
- What is the time frame for expressions of interest and possible funding?

Examining Factors Related to Organizational Level Maintenance/Institutionalization of Health Promotion Programs (proposed by Dr. Russell Glasgow)

Statement of primary research question:
Guided by social-cognitive theory, the purpose of this project would be to study factors related to organizational level maintenance/institutionalization of health promotion programs. A combined qualitative/quantitative approach would be used to identify intervention, personal and organizational factors related to program institutionalization. The project would also develop ways to measure and report on long-term adaptation/continuation of health promotion programs.

Contribution of proposed activity to theory development/measurement enhancement:
Little is known about either characteristics of health promotion interventions or of delivery settings that lead to institutionalization (vs. discontinuance) of programs. The project would contribute to the measurement literature on ways to assess and report on systems level maintenance/adaptation, and to theory and the database on social-cognitive factors related to organizational change (especially the interaction of different factors). This study would also contribute to both the theoretical literature on diffusion of innovations and to the design of interventions intended for dissemination.

BCC's unique position to address this research question:
Several BCC health promotion projects have been conducted in organizational settings at approximately the same time. While the target behaviors addressed are similar and several common assessment instruments have been used across projects, the actual interventions and settings studied differ on a number of conceptually interesting dimensions.

Specific research question and hypotheses:
Specific questions include:

1) What percentage of organizations continue interventions after the completion of the formal study using close to the original protocol, continue with significant modifications/adaptations, or discontinue the program. If continued with adaptations, what types of modifications are made and how is it best to report these changes?

2) What intervention factors (intensity, modality, time and cost, expertise required, explicitness of protocol, visibility of success), personal factors (e.g., self-efficacy, outcome expectations, and perceived value of the intervention held by the primary decision maker in the organization), and organizational factors (leadership commitment, priority attached to health, competing issues) are related to program continuation vs. adaptation vs. discontinuance?

Sites:
A subset of BCC projects conducted in organizational settings such as schools, health care facilities, worksites, faith-based organizations, etc., and interested in collaborating would be involved. These sites have not yet been identified.

Data:
New data collection is being proposed, which would consist primarily of structured interviews and surveys with key organizational representatives as well as project investigators.

Timeframe:
Data collection would occur in three phases. 1) Characterization of intervention characteristics could be completed in the near future. 2) Assessment of personal and organizational characteristics (and relationships with the research group) would be completed soon after the completion of intervention. 3) Finally, we would wait a standard period of time; likely 12 months after the intervention phase of the study had been completed, to conduct final interviews on organizational outcomes.

Analysis:
Data collection and analysis would probably be conducted most efficiently if done centrally, but could be done by each site with a common protocol. Analyses would be correlational and possibly involve both intra-site and cross-site analyses.

Estimated Resources:
Depends on number of sites, but approximately $60,000-80,000 to cover interview and survey administration, data collection, analysis and write-up.

Team leader/Team members:
(In alphabetical order): David Dzewaltowski, Paul Estabrooks, Russ Glasgow, and Lisa Klesges along with key personnel from each of the participating sites

Rough Draft of the Evaluation Frame for the Institutionalization Proposal:
This evaluation draft may be used as a guide for both the quantitative and qualitative components of the proposal.

Environmental Factors

Intervention

a) Frequency — Number of administrations of intervention components/strategies (single versus multiple).
b) Intensity — Expertise required, cost of intervention maintenance, sustainability as an outcome.
c) Type — Modality, policy, program, activity, explicitness of protocol
d) Effectiveness — Was the intervention successful and at what level? Was it clearly communicated to the site?

Organizational Structure

a) Number of sites
b) Formal versus Informal
c) Staff type — Single versus multiple decision makers, infrastructure to promote targeted health behavior, leadership commitment, trained and exist.
d) Competing issues

Personal Factors

Outcome Expectancies related to continuance

a) Level of Effectiveness
b) Cost

Self-efficacy for program continuation

a) To continue the same protocol
b) To cover intervention costs

Behavior

Continuance
Adaptation
Discontinuance

Examining the Relationship Between Social Support and Behavior Change, Health Outcomes, and Quality of Life Proposed by Dr. Deborah Toobert

Statement of primary research question:
For at least some people, social resources are believed to play a central role in shaping personal health and well being. The aim of the proposed investigation is to draw upon the BCC's unique set of research sites and populations to determine how social resources relate to behavior change, health outcomes, and quality of life. For this project, social resources are defined both inter- and intra-personally, and include the traditional conceptualization of support defined by Sheldon Cohen (i.e., emotional, tangible, appraisal, belonging) as well as social environmental resources reflecting more distal factors (such as health care provider support, community support, neighborhood, and friends) and more proximal factors (e.g., family and personal support). In seeking to understand the role that supportive resources play in promoting personal well being, it will be important to distinguish between its mediational value for initial and long-term effects.

Contribution of proposed activity to theory development/measurement enhancement:
Surprisingly little is known about the specific social resources that influence health and well being. To understand how supportive relationships and resources affect health, the traditional notion of support must be expanded. Support can be obtained from proximal, personal sources (such as spouses, friends, and family members), as traditionally conceptualized, but also from more impersonal sources, such as television and one's community. At least two objective measures have been developed to measure interpersonal/social environmental support: the Chronic Illness Resources Survey and the UCLA Social Support Inventory. Data from the UCLA are being collected by two BCC sites (Oregon Research Institute and Harvard); other sites may be using these or similar measures.

BCC's unique position to address this research question:
The BCC provides a unique opportunity to assess supportive resources as a mediator of lifestyle behavior change, maintenance of change across diverse populations and diverse interventions, health outcomes, and quality of life. It may be possible to distinguish different types of supportive resources that work for different types of behavioral lifestyle change, health outcomes, and well being for different population groups. Alternatively, consistent patterns may emerge across different sites.

Shortcomings in the measurement of social resources have made it difficult to draw definitive conclusions. For example, the dependent measure of health used in most studies is self-reported symptomatology, which is highly subjective. The few studies that have included more objective measures of health have used relatively narrow, structural measures of support. Most BCC sites are collecting objective measures of physical health. This would be an opportunity to answer many questions about the health benefits of personal and social environmental supportive resources.

Since many BCC sites have collected data regarding diet, exercise, or smoking, and health outcomes, this investigation provides an opportunity to analyze convergence/replication of measures of supportive resources among diverse populations, diverse lifestyle behaviors, and diverse interventions.

Specific research question and hypotheses:

The specific research questions are:

1. Are associations between various baseline measures of social support and change in various lifestyle behaviors (i.e., smoking, diet, exercise) similar in magnitude? Which measures of social support are most predictive of change in each health behavior, smoking, diet, and physical activity?
2. What are the subtypes of social resources that are most predictive of behavioral lifestyle change, health outcomes and quality of life or well being? Are these associations moderated by socio-demographic variables?
3. Which subtypes of social resources (proximal: e.g., emotional, tangible, appraisal, or belonging; social environmental: e.g., neighborhood, community, media) are most predictive of maintenance of lifestyle change, health outcomes, and quality of life or well being?
4. Research questions stated in terms of mediation:

a. Does treatment enhance perceptions of social resources support? That is, do intervention conditions compared to controls show a greater increase in perceived social resources?

b. Do supportive resources influence lifestyle behavioral changes directly? That is, are changes in supportive resources related to changes in behavior?

c. Do supportive resources influence health outcomes through their effect on lifestyle change? That is, are associations between supportive resources and health outcomes mediated by health behavior change?

d. Do supportive resources effect health outcomes directly? Are changes in supportive resources related to change in health outcomes?

e. Mediation will be demonstrated if the association between intervention and outcomes, i.e., health outcomes and lifestyle change, diminish with the inclusion of supportive resources.

Sites:

Deborah Toobert at Oregon Research Institute, Karen Peterson at Harvard, and Lisa Klesges at University of Tennessee have expressed interest so far. Six or seven BCC sites have indicated that they are using measures of social support, but we have not yet determined the compatibility of their supportive resource data.

Data:

Existing data — including measures of supportive resources, and behavioral indicants of lifestyle change, health outcomes, quality of life, and well being — will be used for the analyses.

For starters, these are some of the scales in use by BCC projects.

Social Resources:

1. Cohen perceived support (i.e., appraisal, belonging, esteem, and tangible)
2. Group cohesion
3. Network support
4. Total score from Medical Outcomes Study Support scale
5. UCLA scales of received support from (a) medical, (b) friends, (c) spouse/relatives, (d) organizations, and (e) negative interactions
6. Chronic Illness Resources Inventory
7. Sallis social support for exercise

Behavioral Indicants:
1. Attendance at intervention (number of sessions attended)
2. Diet
3. Exercise
4. Smoking status
5. Stress management

Health Outcomes:
1. Weight
2. Lipids
3. Blood pressure

It is possible that projects not currently collecting social support data could add one of the more stable supportive resource measures at later assessment points.

Timeframe:
Some of these questions can be answered immediately using existing baseline data. If we included questions about change in perceived support as a result of a support intervention, we would need to wait until the intervention has been delivered, and the data collected and cleaned. Similarly, to answer maintenance questions, follow-up data would be required. If paid staff were devoted to this task, the project would take approximately 6 months.

Analysis Plans:
Some of the questions would be answered using structural equation modeling techniques and others using multiple regression, with supportive resources as mediators/predictors of lifestyle or health outcomes as outlined above. Some of the questions involve mediational analysis. Lisa Strycker at ORI is an expert in structural equation modeling but there may be other sites interested in this. Lisa Klesges from the methodology group has expressed initial interest in this project.

Research questions succinctly stated in terms of a test of mediation (as suggested by Baron & Kenny) are:
1) Is intervention related to change in social support?
2) Is change in social resources related to change in health behavior and health outcome?
3) Does association between intervention and outcomes, both lifestyle behavior and health outcomes, diminish when perceived support is included in the model.
4) Do changes in supportive resources, as result of support interventions, predict behavioral lifestyle change and health outcomes? If so, we should see that treatment produces an increase on the proposed mediator, supportive resources. It would be interesting to see the potential difference in magnitude of change in supportive resources between interventions specifically targeting this construct and those that did not. Might address question of generalized social interactions of behavioral interventions in general versus those targeting supportive resources.

Estimated Resources:
This project would require at least one research assistant to coordinate the data collection from sites. Funds for a data analyst and for an investigator to prepare the manuscript also would be required. We are estimating $80,000-100,000.

Team leader/Team members:
Deborah Toobert, Karen Peterson, Lisa Klesges, Russ Glasgow, and Lisa Strycker.

Exploring the Role of Environmental Influences on Regular Physical Activity (proposed by Dr. Abby King and Dr. Cynthia Castro)

Statement of primary research question:
Faced with the growing epidemic of inactive behavior patterns in the U.S. and other industrialized nations, the importance of understanding the factors contributing to physical activity spanning all levels of impact have been recently recognized. While the majority of investigations of relevant physical activity-related influences have occurred primarily at the personal/interpersonal levels of analysis, the potentially important role of the physical and social environments in influencing daily levels of physical activity has been increasingly emphasized. The primary aim of the proposed work is to investigate environmental correlates of physical activity across diverse population samples.

Contribution of proposed activity to theory development/measurement enhancement:
To date, the environmental arena has been hampered by a lack of standardized assessment tools that accurately capture different environmental domains that may influence daily activity levels, as well as serve as potential targets for intervention. This is changing with the recent development of a psychometrically sound perceived environment instrument by Dr. Jim Sallis and colleague at SDSU. This second-generation instrument represents the current 'state-of-the-art' in evaluating aspects of the individual's environment that may encourage or hamper regular physical activity. Thus far, the data that Dr. Sallis has collected with this instrument in several samples are promising. The next step in this area of research is to assess the relationships between the different environmental domains assessed via this paper-and-pencil instrument and physical activity levels (as well as, potentially, other health behaviors) in a much broader and more diverse range of population groups.

From a theoretical perspective, although the most prominent behavior change theories used in health behavior research (e.g., social cognitive theory) emphasize the importance of evaluating and understanding the environmental factors that may influence individuals' decisions to become or remain physically active, in practice, few researchers have attempted to thoroughly evaluate or understand these environmental factors. The currently proposed investigation thus provides a useful opportunity for broadening current applications of social cognitive theory and similar perspectives through a more systematic understanding of potential environmental influences.

BCC's unique position to address this research question:
In order to substantively advance our understanding of the potential role that the environment may play in influencing an individual's physical activity levels, the systematic collection of environmental information across a diverse range of population groups is currently needed. The BCC is in a unique position to provide such a diverse range of individuals. Given the current dearth of information in this field, an important next step in advancing the field concerns the collection of cross-sectional data evaluating the link between individual's physical environments and their current physical activity levels.

The cross-sectional nature of the primary questions to be addressed and the fact that the environment domains to be assessed are considered to be stable aspects of an individual's environment make the data collection for this proposed study relatively simple.

Specific research question:

1) What is the relationship between different perceived environmental domains and current physical activity levels across a range of population samples? These domains include types of residences in one's neighborhood, locations of and access to stores and other facilities in one's neighborhood, the local street/walking environment, including presence of infrastructure for walking (e.g., sidewalks), neighborhood surroundings (e.g., trees, hills), neighborhood safety, the home and work-related physical activity environments, and a brief neighborhood social cohesion scale.
2) What are potential moderators of the perceived environment/physical activity relationship? (e.g., gender, age, ethnicity, marital status or household size, employment status, health status).
3) Other potential secondary questions of interest include: relationships of these perceived environmental domains to other current health behaviors; the potential impact of these environmental factors as moderators of subsequent physical activity changes; and the relationship of the perceived environmental factors to other potentially important outcomes of interest, such as health-related quality of life.

Sites:

Thus far, BCC sites that have expressed potential interest, in addition to Stanford, are Harvard, University of Maryland, Rush-Presbyterian, and URI. Dr. Coday's Memphis group is currently collecting two of the environmental domain scales as part of their trial (i.e., the home environment and neighborhood surroundings scales), and thus could also be included for that portion of the data analysis.

Data:

I have conferred with Dr. Sallis, and he and I are in agreement that a substantive contribution to the physical activity literature can be made through analysis of cross-sectional data. In addition, because of the stable attributes of the environmental domains being assessed, it is permissible for sites to collect these data at the most convenient time(s) for them throughout their study. (For example, the Stanford site is currently collecting these data at baseline for those participants initially entering the trial, and between 6 and 12 months for participants already enrolled in the trial). Many of the sites who have expressed interest in this study have overlapping physical activity measures, which should expedite data analysis and interpretation.

Timeframe:

As noted above, the collection of the environmental paper-and-pencil survey (which takes approximately 20 minutes to complete) could begin immediately on all or a subsample of participants enrolled in any of the BCC studies in which physical activity behavior is also being collected.

Analysis plans:

The analytical approach could include both intra- and inter-study analysis based on linear regression models and similar approaches. To expedite data cleaning and analyses, a central data analyst, located at Stanford, is recommended (i.e., Dr. David Ahn, who currently serves as the statistician/programmer for the Stanford CHAT project). Dr. Lisa Klesges received, along with other members of the BCC physical activity committee, an initial e-mail briefly describing the study concept. We are happy to work with the data analysis and methods group as appropriate.

Estimated Resources:

Total Estimated budget (direct costs) (5/1/02 – 4/30/03): Approximately $45,000.

Team Leader/Team members:
The team leaders will be Drs. Abby King and Cynthia Castro at Stanford (email addresses: king@stanford.edu and cynthia.castro@stanford.edu, respectively). We propose that each participating site identify one person who will serve as the team member from their site.

Measurement of Activity in Older Adults:
A Multi-study Comparison
(proposed by Dr. Barbara M. Resnick)

Statement of primary research question:
Recent advances in electronics and computer technology have allowed for increased sophistication of the electronic and mechanical methods of measurement of activity. This has resulted in studies of activity and exercise behavior that include multiple measures of activity. The intent of these studies was to triangulate these different methods of measuring activity (Durante & Ainsworth, 1996; Masse et al., 1998; Measurement of Moderate Physical Activity: Advances in Assessment Techniques, 2000; Sarkin, Nichols, Sallis & Calfas, 1998; Sims, Smith, Duffy & Hilton, 1999). Unfortunately, attempts to triangulate activity measures, or validate one type of measure against another have consistently demonstrated weak relationships (Allison, Keller & Hutchinson, 1998; Leenders, Sherman & Nagaraja, 2000; McDermott et al., 2000; Sims et al., 2000; Sirard, Melanson & Freedson, 2000; Wareham & Rennie, 1998). Moreover, there is often significant participant burden while having to respond to numerous activity related questions and multiple surveys. The primary aims of this study, therefore, are to:
(1) To examine the relationship between two commonly used survey measures in three different samples of older adults.
(2) To explore the feasibility of completion of these two different surveys of activity for older adults.
(3) To determine the validity of each measure and the ability of each measure to identify change over time.
(4) To test three different measurement models of activity in healthy community dwelling older adults and older adults post hip fracture.
(5) To establish the most parsimonious method of assessing activity/exercise in older adults.

Contribution of proposed activity to theory development/measurement enhancement:
There are a wide variety of methods available to measure activity in older adults. Unfortunately, each of these methods measures only a single aspect of overall activity, such as steps taken, movements in vertical planes, or subjective reports of activity. Of these, survey reports tend to be the most popular method of measurement due to cost and ease of administration. Unfortunately the reliability and validity of surveys is inconsistent and survey results frequently overestimate activity (Branch & Meyers, 1987; Dishman, Darracott & Lambert, 1992; Paffenberger, Blair, Lee & Hyde, 1993; Pols, Peeters, Kemper & Collette, 1996; Sims, Smith, Duffy & Hilton, 1999).This study will add to the current science of activity measurement in older adults by helping to establish the utility of two surveys developed specifically for older adults, as well as demonstrating a potentially more comprehensive way in which to conceptualize and measure activity in older individuals.

BCC's unique position to address this research question:
The BCC is in a unique position to address these research questions as, at the inception of the BCC, the collective expertise of the three research teams focusing on behavior change in older adults was pooled with regard to measurement of activity. The teams decided to include in their respective studies: (1) two specific survey measures; and (2) an objective measure of activity. To build on the current state of knowledge in this area the proposed plan of study was developed. While each of these studies uses different populations and different interventions, the models of activity developed for each study will help us determine which model, i.e. which group of measures, explains activity the best in an older population. Supplemental funding is

being requested to support the additional data collection required at each site (i.e. the qualitative data), as well as the cross-study data analysis at the completion of the studies.

Specific research questions:

1. What is the relationship between the Yale Physical Activity Survey (YPAS) and the CHAMPS in three different samples of older adults, and is it consistent across the three groups?
2. Can three different groups of older adults consistently complete both the YPAS and the CHAMPS and what are the challenges noted during data collection?
3. Is there a statistically significant relationship between the YPAS and the CHAMPS with an objective measure of activity (accelerometer, pedometer or step activity monitor) and exercise logs?
4. Are the YPAS and the CHAMPS able to pick up change in activity over time in older adults in the three samples studies?
5. Which of the three models of measurement of activity explains this concept best with regard to older adults?
6. What is the most parsimonious way in which to measure activity in older adults?

Sites:

All three of the aging studies, which include: Abby King, Stanford University; Phil Clark, University of Rhode Island; and Barbara Resnick, University of Maryland.

Data:

At the onset of these three projects several common measures were identified to explore activity. This existing data will be used in this study. Specifically these measures include: The Yale Physical Activity Survey (YPAS) and The CHAMPS activity survey. In addition, objective data from the activity monitors used in each study will be utilized. The activity monitors includes the Step Activity Monitor, The Computer Science Applications Inc. (CSA), and the Yamax. A qualitative interview with research staff involved in data collection will be done to explore the survey completion process.

Timeframe:

The proposed study will use both baseline and 12-month data to answer the research questions. All research questions cannot be answered until all three studies have obtained their 12-month follow-up data. It is anticipated that this will occur by January of 2003. Data analysis of the baseline measurement models of activity, however, can be initiated once baseline data are collected. In addition, the proposed study includes a qualitative interview to be done with those individuals who are collecting the survey data. This interview should be done following the completion of 12-month data collection, as there may be a difference in the older adults' ability to complete either of the measures at different points in the study.

Summary Budget:

Expenses (across sites)	Year 1 Amount
Personnel: **Salaries ($60,000); Fringes ($10,700)**	**$ 70,700**
Operating Expenses: **Supplies ($100); Travel ($1,500); Other (subj. F & A) ($2,700)**	**4,300**
Total Direct Costs	**75,000**
F & A (Indirect costs)	**36,000**

Self-determination and its Relation to Depression proposed by Dr. Geoffrey Williams

Statement of primary research question:
To conduct a cross-site analysis of the Self-determination Theory (SDT) model of health behavior change and its relation to depression. Structural equation modeling (SEM) will be used to determine the extent to which change in perceived autonomy predicts change in health behaviors and depressive symptoms over time. Adherence to the behavioral regimen will be tested as a mediator between perceived autonomy and development of depressive symptoms.

Contribution of proposed activity to theory development/measurement enhancement: Six BCC sites representing some 8800 participants have completed autonomy, health behavior change (smoking, exercise and or diet) and depressive symptoms, with some sites also measuring competence and autonomy support provided the BCC investigators at the start of the grants. This sample size will allow confirmatory factor analyses, and causal modeling of autonomy as common predictor of behavior change and depressive symptoms across sites. In addition, we intend to develop a "transbehavioral outcome" metric based on estimates of reduction in 30 year mortality that will allow combining the different health outcomes (Woolf, 1999), and alternatively based on clinically preventable burden of disease (Coffield et al, 2001). Development of this metric will facilitate translation of BCC findings for policy makers and clinicians alike. We will also explore causal paths of failure in adhering to behavior change as a mediator between perceived autonomy and development of depression. Finally, we will test the mediation of perceived autonomy on the relationship of motivational interviewing interventions and the change in health behavior. This last theoretical test will potentially link the technique of MI to the mediator of perceived autonomy for the first time.

BCC's unique position to address this research question:
The BCC sites comprise the largest number of participants completing this set of measures (at least 10 times larger than previous data sets). The BCC also represents the first time change in perceived autonomy will be measured over time in relation to MI interventions. Finally, the longitudinal nature of the BCC data sets will allow the first time exploration of the development of depression as a failure to achieve a desired and recommended health outcome.

Specific research question and hypotheses:
1) To test the mediation of perceived autonomy between BCC interventions and outcomes of individual health behavior change, between the BCC interventions and the combined outcome of reduction of 30-year mortality, and between BCC interventions and depression.
2) To test the mediation of adherence to recommended health behaviors between perceived autonomy and development of depressive symptoms.
3) To test the more specific hypothesis that perceived autonomy is enhanced by BCC interventions based on motivational interviewing.

Sites:
University of Rochester (smoking and diet), Stanford (exercise), Oregon Research Institute (diet and exercise for patients with diabetes), University of Tennessee (exercise), University of Michigan (smoking, diet, exercise), Emory (diet and exercise), and Oregon Health Sciences University (diet, exercise).

Data:
Perceived autonomy, health behaviors (smoking diet, and exercise), demographics, and depressive symptoms.

Timeframe:
Baseline data can be used for confirmatory factor analysis, change analyses will be conducted after outcomes obtained. We estimate the analyses will take 12 months from time final data is collected (3 years).

Analysis:
Structural equation modeling with growth curve analysis will be used to test the SDT and depression hypotheses above. Consultation with CDC (Woolf and Coffield) will be used to develop a transbehavioral metric.

Estimated Resources:
$150,000 direct costs estimated. 10% effort from PI at University of Rochester, 15% effort Holly McGregor and 15% Chantal Levesque University of Rochester for data management and analyses. Edward Deci PhD will also participate (3%) in the planning and execution of the analysis. Consultation costs for CDC database for mortality and CPB based "transbehavioral" outcomes, and biostatistician. $2,000 per site for data management and transfer. 1 computer and SEM software, travel to 3 meetings. These may be additional costs for input from investigators at other sites.

NIMH has looked at this as a potential administrative supplement, and has expressed interest. It has asked if there is a potential co-funder. Also, we need support into the year after BCC ends to complete analyses.

Team Leader/Team Members:
Geoffrey Williams MD, PhD, Chantal Levesque, PhD, Holly McGregor Senior Graduate Student University of Rochester, Ruth Kouides MD, MPH. Potential for additional investigators to join us.

References:
Coffield, Maciosek, McGinnis et al. Priorites among Recommended Clinical Preventive Services. A.J. Prev Med 2001;21(1):1-9.

Woolf S.H.: (1999). The Need for Perspective in Evidence-Based Medicine. JAMA 282:2358-2365.

Testing the Retention Effectiveness of Three Delivery Systems in Underserved Populations (Proposed by Dr. Tamara Sher)

Statement of primary research question:
Effective, low cost programs for changing health behaviors among under-served groups are high-priority targets of public health research (Jeffrey, Danaher, Killen, Farquhar & Kinnier, 1982; Marcus, Owen, Forsyth, Cavell, & Fridinger, 1998). In particular, lower SES individuals are less likely to visit a physician for non-urgent health care and receive less advice from their physician on preventive health practices such as diet and physical activity (Billings, Zeitel, Lukomnik, Carey, Blank & Newman, 1993). Efforts to retain these underserved patients in behavioral trials have been weak at best. We know little from empirical research about how to retain participants in clinical trials from underserved populations. The purpose of this project is to better understand the effects on retention efforts of three different treatment delivery systems (telephone, in-person individual, and in-person group) for implementing change in physical activity and nutrition. To date, no studies of which we are aware have evaluated treatment compliance and follow up rate issues across delivery method.

Contribution of proposed activity to theory development/measurement enhancement:
The goals of this project are two-fold: First, we aim to compare which treatment delivery system (telephone versus in-person individual versus in-person group) is best for retention of a minority, at risk population and for what compliance outcomes (nutrition versus physical activity). This is a process goal we believe has previously been neglected in empirical evaluation. The second goal is to compare which treatment delivery system is more effective at reaching its outcome goals (weight, nutrition, and physical activity changes) and which is more cost efficient at reaching these goals. This project is designed as a first step in understanding the relationship between mode of treatment delivery and retention of under-served participants. We hope to use this information to solicit further funding to compare treatment delivery systems of a broader scale with inclusion on a wider level and inclusive of more innovative technologies (i.e. telephone versus Internet versus in-person). Additionally, we hope in future studies to incorporate treatment matching (participant preference for delivery system) in an effort to further improve retention and adherence to compliance and outcome goals.

BCC's unique position to address this research question:
The BCC is in a unique position to address this question since data exist on target populations (e.g. at risk, low SES, women) with physical activity and/or nutrition interventions and outcomes. Follow up rates and treatment compliance information is available both within and across sites on these retention issues. Additionally, the BCC represents many different constituencies and underserved populations that this project is particularly interested in understanding.

Specific research question and hypotheses:
The research question is which treatment delivery system for an intervention on changes in weight, physical activity, and nutrition is best for the following: (a) treatment compliance to physical activity or nutrition interventions; (b) retention of underserved minorities; and (c) meeting its outcome goals. We hypothesize that while all treatment delivery systems will achieve their outcome goals post-treatment, those including more individualized approaches (in-person) will have better results across time. However, we also hypothesize that the approaches designed to serve the most people will be the most efficient at reaching its goals (telephone).

Sites:
All sites at the December 2001 R&R meeting expressed an interest. Particular population interest groups were IIT (at risk for CHD), UT (under-served low SES adults), and ORI (at risk women with diabetes). Additional sites may be interested who were not represented at the last meeting. We will firm up participation on the next conference call in January.

Data:
We will collate retention data (numbers of drop-outs, lost to follow up, deaths, missed visits versus completers); intervention compliance data (% logs and % attendance), and outcome data (nutrition, physical activity, and weight change) from participating sites that collected this data as part of their original project. .

Timeframe:
This is proposed as a one-year project. The project will primarily entail the collection of the data from the sites that wish to participate, the synthesis and organization of the data, and the analysis of the data. Because new data is not being collected, we do not anticipate time constraints or complications requiring more time. Throughout the project the retention questions are considered primary, while the outcome questions are an additional interest. This project requires the last follow up visits to have occurred in the participating sites and then approximately one year to collate and analyze these data.

Analysis plans:
This is designed as 3 separate, 3 (delivery system) x 2 (nutrition versus physical activity) analyses of variance with retention and outcomes as the dependent variables. The results will be analyzed centrally and ideally with the data analysis and methods group.

Estimated Resources:
We anticipate that the major expense for this project will be on statistical consultation. We anticipate hiring a statistical consultant at 50% time for 1 year and also a graduate student to collate and prepare the data from participating sites (approximately $75,000-$100,000). Additionally, we will devote 10% of our time to this endeavor.

Team leader/Team members:
Tamara Sher, Lynne Braun, Jennifer Tennant, Mace Coday

Using GIS Lifestyle Segmentation to Profile Physically Inactive Lifestyle Clusters (proposed by Dr. Greg Welk and Dr. Fred Fridinger)

Statement of primary research question:
The purpose of this research is to test the utility of using geodemographic lifestyle clusters to better understand physical activity behaviors across the 15 Behavior Change Consortium (BCC) projects. Finding better ways to identify whom the targets are, what they are like, where they are located, and how they can be reached are important aims of the field of public health education.

Marketing databases are widely used in the commercial sector to develop messages to promote products and services to potential customers. They contain proprietary and public information on sociodemographic characteristics, consumer behavior, lifestyle activities, and media habits of potential customers. A primary use of such data is to identify audience subgroups that may differ in interests, lifestyle, and media habits in order to design effective messages and deliver them through appropriate media channels (Myers, 1996; Weinstein, 1994). A widely used framework for audience analysis (geodemographic segmentation) involves grouping together small geographical units on the basis of demographic and other characteristics that they have in common. The clusters derived through geodemographic segmentation provide relatively homogenous and distinctive lifestyle groupings that may be useful for health communication planning and targeting.

The segmentation system to be used is this project is the PRIZM© system (Claritas, Inc., 1994; Weiss, 1989,1999), developed by Claritas, Inc., a large marketing information services organization. This database includes codes that categorize the population into 62 clusters with distinct demographic and behavioral characteristics, with each of the 15 social groups containing between two to five clusters. Each cluster contains between .5% to 3% of the U.S. population. Every census track or zip code block group in the U.S. falls into one of these 62 clusters based on their overall demographic characteristics. (Additional information on the development and application of the PRIZM system is included in the Appendix at the end of the proposal)

Contribution of proposed activity to theory development/measurement enhancement:
Social marketing is a relatively recent health intervention methodology that has been defined as "the application of commercial marketing technologies to the analysis, planning, execution, and evaluation of programs designed to influence the voluntary behavior of target audiences in order to improve their personal welfare and that of their society" (Andreasen, 1995). Central to the social marketing approach is a "consumer orientation" to program development and implementation based on precise audience segmentation strategies. The target population is segmented or separated into homogenous groups that are uniquely targeted with messages tailored to their shared qualities. A better understanding of social marketing approaches will be especially important as promising interventions and trials move from efficacy to dissemination.

BCC's unique position to address this research question:
A goal of the BCC is to test innovative behavior change strategies and advance current understanding of effective intervention strategies. The broad range of sites and projects in the BCC would provide a useful testing for the potential effectiveness of these social marketing techniques and their relationship to concepts and measures already being collected by BCC

investigators. The results from this project may serve as a useful pilot test for subsequent BCC activities and projects.

Specific research question and hypotheses:
The specific objectives of this research study are to:

(1) Identify predominant lifestyle clusters within the defined geographic areas of the 15 BCC projects;
(2) Profile these lifestyle clusters using a market segmentation software system that combines census, geodemographic, and lifestyle information; displaying not only exercise/physical activity behaviors but how these clusters profile on consumer behaviors such as media usage and product purchase behavior;
(3) Incorporate specific BCC project data (determined by individual sites) into the PRIZM profile system to address how the lifestyle clusters profile on project specific parameters;
(4) Assist BCC project staff in interpreting the cluster profile data for intervention, communication and outreach purposes.

Sites:
We are interested in conducting this study at all 15 BCC sites. The following sites have already expressed a definitive interest and a contact person has been identified.

Site	Principal Investigator	Contact Person
Kansas State University	David Dzewaltowski	David Dzewaltowski
Illinois Inst. of Technology	Tamara Goldman Sher	Lynne Braun
Harvard School of Public Health	Karen Peterson	Chuck Matthews
Stanford University	Abby King	Abby King
University of Tennessee	Robert Garrison	Mace Coday

Data:
In this proposed project, four different kinds of data are linked together through geographic identifiers: 1. ***U.S. Census data*****:** Demographic information on the adult population from every household within the United States; 2. ***GIS data*****:** Geographic boundary files, roads, and landmarks (specific mapping software database supplied by Claritas, Inc.); 3**.** ***PRIZM Cluster data*****:** Market research and demographic data summarized by 62 distinct lifestyle clusters (see description above); and 4. ***Project specific data from the BCC sites:*** The specific types of data to be combined and analyzed with this system may be variable across the sites or could include some of the common measures being proposed across sites (e.g. stages of change for physical activity). Project specific data can be integrated into the database as long as street addresses and zip codes can be added to the specific dataset.

Emphasis is currently being placed on physical activity outcomes since most sites include physical activity measures and also because it may be possible to directly link specific state-based data from the BRFSS onto the geocoded data. The nature of the design, however would allow each site to select which types of variables or outcomes they want processed with the database. To facilitate the acquisition of this project specific data from all sites, we have included two days of consulting ($1,000) for each participating site (see budget). This will help offset the time required to convert existing data sets and submit them for use in the project.

Timeframe:
The study can utilize existing baseline data. Depending on the timeline of the project, the results from the analyses may prove useful to sites in their continued efforts to understand and influence their target population. Alternately, the results may help sites to interpret their outcomes. Theory would suggest that the results from a particular intervention might vary for individuals in different lifestyle clusters (i.e., materials or strategies may be more effective for one type of population but less effective for another). Pre-post differences could be merged to the other data in the system to examine which lifestyle clusters achieved the best results in the intervention.

Analysis plans:
Using the PRIZM software system, each of the 15 BCC project target populations will be profiled against the PRIZM cluster profiles. The first step in the analyses will be to run a Household Distribution of PRIZM clusters for a selected geographical area (e.g., ZIP code or block groups within the zip code) within each of the 15 BCC projects to determine what percent of the total households in that area can be found in a specific cluster(s). Once the predominant lifestyle cluster (s) is identified in each area, clusters (and hence specific geographical locations) that ranked above average or high on physical inactivity will be identified. Three indices will be generated by the Claritas "Consumer Point" software program that will indicate the extent to which physical activity behaviors occur at above-average or below-average levels for each of lifestyle clusters identified for each project site. These three indices include: *Target Cluster Composition* = Percentage of all those physically inactive individuals who belong to a specific lifestyle cluster; *Target Cluster Coverage* = Percentage of adults within a specific lifestyle cluster that are physically inactive; and *Target Cluster Index* = Measures the extent to which physical activity by a specific lifestyle cluster is above or below the national average (average index = 100).

The principal investigators (Dr. Welk and Dr. Fridinger) would work collaboratively to carry out the major tasks in the project. Dr. Welk would work with the individual BCC sites and project staff to clarify specific variables and outcomes that would be analyzed within the marketing system and to get the individual data sets into formats that can be used with the PRIZM program. Dr. Fridinger would coordinate the processing of this data with the help of a research assistant at his site. The database system used in this project may have implications for other ancillary projects. We welcome collaboration from other groups and additional linkages with other projects.

Estimated Resources: Total estimated cost = $62,500 (direct only).

1. Salaries and wages
   Principal Investigators: Estimated cost is $14,000
   Both investigators would be involved in the overall project over the whole year at approximately 10-12% time. Actual involvement may depend on the scope with which the project is conducted.

   Graduate Research: Estimated cost is $8000.
   One Graduate Research Assistant (M.P.H. student) will be hired part-time (~10 hours/week for one year + benefits). Student will be trained in software application, conduct all segmentation analyses, and assist Dr. Fridinger in technical assistance to BCC projects.

Consulting fees: Estimated cost is $15,000 (2 days at $500 for each participating site) A contact person at each site would be identified to assist with converting existing data sets into formats suitable for use with the geocoding systems.

2. General Operations

Software: Estimated cost is $23,000

Purchase of yearly PRIZM software system license from Claritas, Inc. The Consumer*Point* marketing analysis system delivers state-of-the-art reporting, charting, and mapping capacities, and allows the full data system to run in a coordinated manner by integrating demographic, marketing, and cartographic data from a single source. Consumer*Point* runs the general applications, and comes with PRIZM market distributions, road and highway mappings, software training, and documentation.

General office supplies: Estimated cost is $500

Needed for paper, postage, pens/pencils, paper clips, staples, etc.

Capital Equipment: Estimated cost is $2000.

The parameters of the Claritas PRIZM software license requested in this proposal requires a specific dedicated workstation. One personal computer and accompanying printer are needed in which to load the software, run the analyses and print the results.

Team Leader/Team members:

The project will be coordinated by Dr. Greg Welk (gwelk@iastate.edu) and Dr. Fred Fridinger (ffridinger@hsc.unt.edu). Input or involvement from the different sites may depend on the nature of the specific intervention and their interest in this type of project. A representative from the participating sites would be needed as a contact person on the project.

Development and Background Information on PRIZM

The first step in the development of the current PRIZM system was a series of factor and cluster analyses of the 1990 census data for the more than 226,000 block groups in the U.S. (Barrett, 1994; Lavin, 1996) to account for most of the variation among block groups, resulting in 15 social groups varying along 5 levels of urbanization (rural, town/exurban, 2nd city, metro suburb, metro urban) and 3 levels of socioeconomic status (low, mid, high). A second-stage of domain dependent clustering within each of these social groups subdivided them further into subgroups or lifestyle clusters on the basis of various demographic factors. The cluster solution is then tested and refined with large public and proprietary databases on consumer behaviors involving purchases, media use, consumer credit, and other lifestyle data. Claritas, Inc., conducts a proprietary update of the census data each year and areas are assigned to clusters based on their current-year demographics.

Some of the key differentiating factors among the clusters, along with the general urbanization and SES factors, are the distributions and modal characteristics within the clusters of income levels, family life cycle stages, age, education, occupation, and housing types. The cluster framework also provides finer distinctions for targeting populations defined in terms of race/ethnicity. For instance, Hispanics exceed the national average in 21 clusters and predominate in 5 others.

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